ABSTRACT OF THE INVENTION

Devices and methods are disclosed for moving charged molecules through a medium by the application of a plurality of electrical fields of sufficient strength and applied for sufficient amounts of time so as to move the charged molecules through the medium. The devices although preferably small in size, preferably generate large numbers (100 or more) of electrical fields to a movement area which preferably contains a liquid buffered or gel medium. Mixtures of charged molecules are pulled through the gel by the force of the electrical fields. The fields are preferably activated simultaneously or sequentially one after another at various speeds to create complex force field distributions or moving field waves along the separation medium. Charged molecules capable of moving quickly through the gel will be moved along by the faster moving field waves and be separated from slower moving molecules. The fields can be activated by computer software and can be used to move molecules away from and toward each other to obtain rapid and complex chemical synthesis, sequencing or reaction protocols.